



January 30, 2018
Municipality of West Perth
169 St. David Street
Mitchell, Ontario
N0K 1N0

ATTENTION: **Mr. Jeff Brick**
 CAO

REFERENCE: **Municipality of West Perth**
 Annual Wastewater Report 2017

Please find enclosed the Municipality of West Perth, Mitchell Wastewater Treatment Facility; Annual Operations Report 2017. The report is prepared in accordance with the annual report criteria within Environmental Compliance Approval # 5159-94HKX8 containing the following;

- Section 1: A summary and interpretation of all monitoring data and comparison to effluent limits;
- Section 2: A description of any operating problems and corrective actions;
- Section 3: A summary of the maintenance activities;
- Section 4: A summary of effluent quality assurance measures;
- Section 5: A summary of calibration methods and maintenance procedures for all monitoring equipment;
- Section 6: A description of efforts made and results achieved in meeting Effluent Objectives;
- Section 7: A tabulation of sewage quantities and characteristics from all sources;
- Section 8: Sludge generation volume and disposal methods;
- Section 9: A summary of any complaints received during the reporting period and actions taken to address the complaints;
- Section 10: A summary of all by-pass, spill or abnormal discharge events;

On behalf of the municipality, a copy of this report has been sent to MOE in the London Office (Mr. Stephen Dunn).

Yours very truly,

Municipality of West Perth

Environmental Services

1. Summary and interpretation of all monitoring data and comparison to effluent limits

The annual monitoring reports for the year are attached in accordance with the Environmental Compliance Approval requirements and guidelines for the period from January 01 to December 31, 2017.

The annualized average daily flow for the year was estimated to be 4.316 MLD, which represents approximately 60% of the expanded design capacity for the treatment facility (average day design flow 7.2 MLD). The maximum daily flow, which occurred in the month of May, was 16.821 MLD. Both the average and maximum flows for 2017 were greater (Average: 23%, Maximum: 10%) than in 2016.

The treatment plant was able to handle and treat the average daily flows, while the high peak flows were diverted and temporarily stored in the peak overflow cell for treatment when flow volumes returned to normal.

The annual effluent CBOD₅ and suspended solids achieved the annual criteria effluent limits (concentration and loading) for the freezing and non-freezing periods.

The effluent total phosphorus achieved the monthly criteria effluent limits (concentration and loading) during the freezing and non-freezing period.

The effluent ammonia results achieved the daily criteria effluent limits (concentration and loading) for the freezing and non-freezing period.

The effluent discharge criteria in the Environmental Compliance Approval consist of two seasonal conditions 1). Freezing, and 2). Non-freezing temperature conditions, and two quality standards 1). The effluent limits which shall not be exceeded, and 2). The effluent objectives which best efforts will be made to operate the works in compliance with.

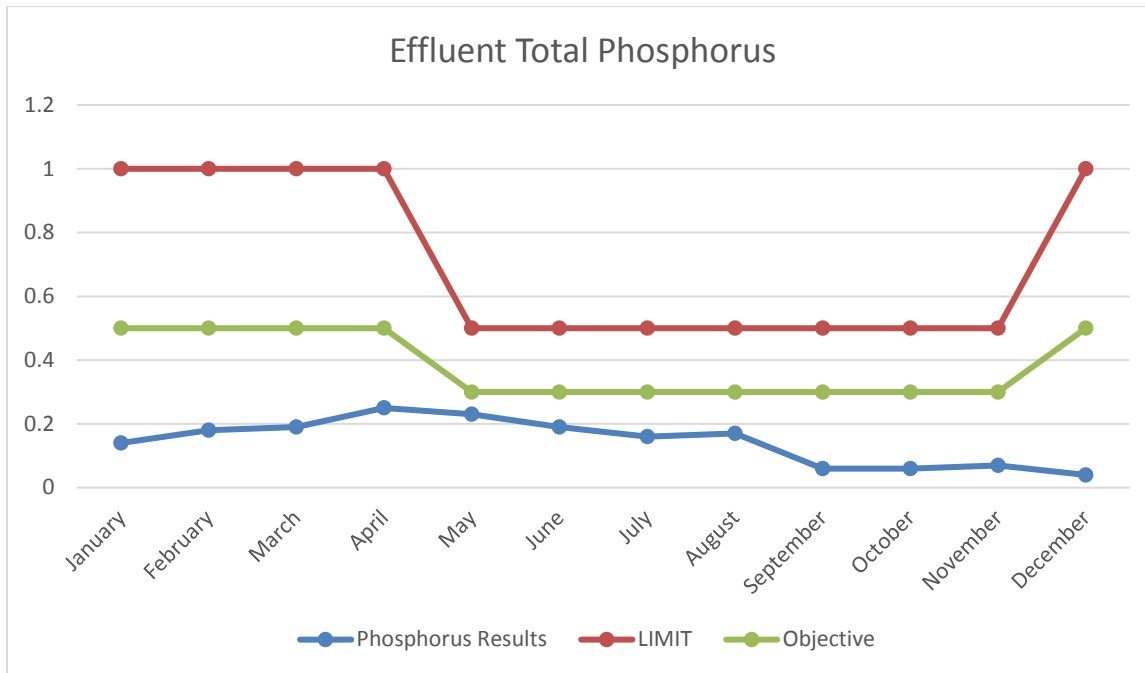
The plant was able to achieve the criteria for the more stringent effluent objectives in all parameters tested.

The Dissolved Oxygen (DO) level was recorded above 4.0 mg/l during the non-freezing period and above 5.0mg/l during the freezing period. The pH remained between the 6.5 to 9.0 criteria throughout the year.

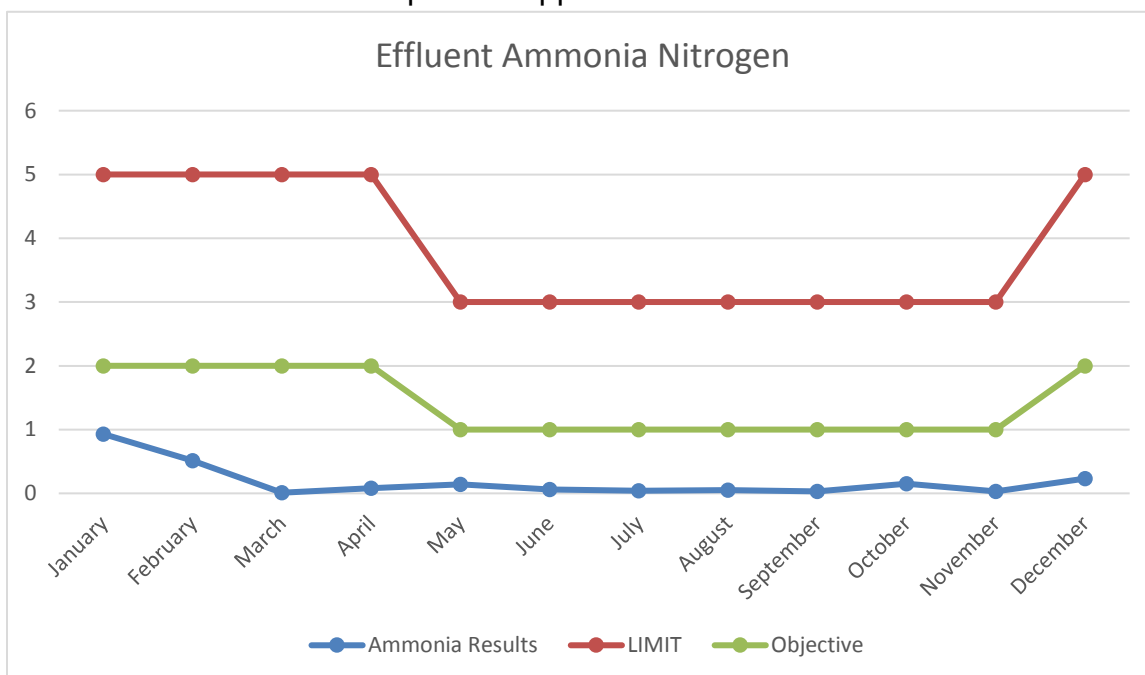
Summarized the annualized effluent concentration for Carbonaceous Biochemical Oxygen Demand, Suspended Solids, Total Ammonia and DO as follows:

Effluent Quality	Annual Average Concentration mg/L	Concentration Criteria mg/L @ freezing	Concentration Criteria mg/L @ non-freezing	Compliance
CBOD₅	1.03	<15	<10	Annual
Suspended Solids	3.57	<15	<10	Annual
Ammonia	0.19	<5.0	<3.0	Daily
Dissolved Oxygen	7.12	>5	>4	Monthly

For the effluent total phosphorus, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:

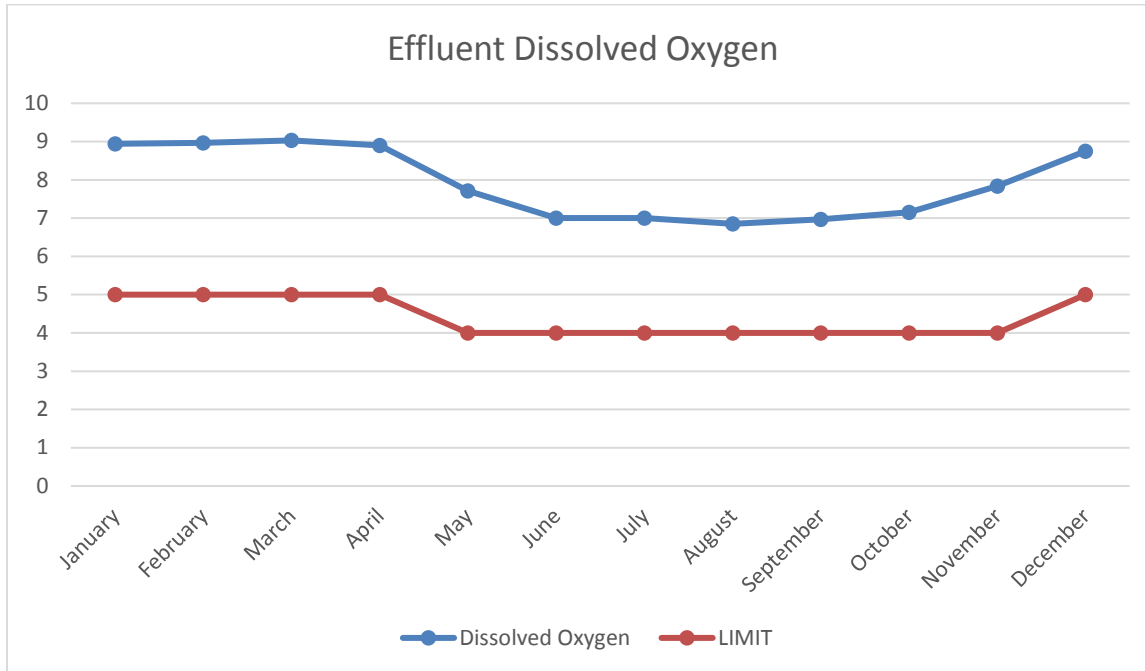


For the effluent Ammonia, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:



For the effluent Dissolved Oxygen, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:

Note: Unlike the previous charts the dissolved oxygen parameter must be maintained above the limit.



The calculated removal efficiencies achieved at the treatment plant for the main effluent parameters are highlighted as follows:

- CBOD₅ removal efficiency was 99.6%
- Suspended solids removal efficiency was 97.9%
- Total Phosphorus removal efficiency was 96.7%

The annualized average effluent loading is compared to the loading criteria for both the non-freezing and freezing period in the table below;

Effluent Parameter	Loading Kg/day	Loading Criteria kg/day @ freezing	Loading Criteria kg/day @ non-freezing
CBOD₅	4.78	108 annual	72 annual
Suspended Solids	15.72	108 annual	72 annual
Total Phosphorus	0.85	7.2 annual	3.6 annual
Ammonia	0.97	36 daily	21.6 daily

The annual average effluent loading for CBOD₅, Suspended Solids and Total Phosphorus achieved compliance with the Environmental Compliance Approval effluent loading criteria. The daily ammonia loading also achieved compliance with the Environmental Compliance Approval effluent loading criteria.

The E coli results did not exceed 200 counts per 100 mL during the required disinfection period from March 15 to October 31. The pH level for the wastewater effluent averaged 7.55 and the dissolved oxygen averaged 7.12 mg/l for the year 2017.

The maximum monthly average un-ionized ammonia value for 2017 was 0.052 mg/L, The ECA requires un-ionized value to be less than 0.1 mg/L at all times.

2. Description of operating problems and corrective actions

Q1 2017: Herbert pump 3 failed, windings burned out. Pump pulled to be replaced.

Two Tertiary bypass events, high flows caused a bypass of tertiary sand filters.

Partial Treatment bypass, blower failure caused a bypass of aeration cells.

Q2 2017: Partial Treatment bypass, blower failure caused aeration cell bypass. Back up blower system put in place.

Q3 2017: WWTP generator water supply valve failed, causing generator to overheat. Temporarily bypassed valve. Sommers Generator replaced solenoid for water supply valve.

Q4 2017: Blower 1 in-board bearing failed, Blower 3 RTD sensor failed.

3. Summary of maintenance activities

Megamation is used to schedule the maintenance activities at the treatment plant and pumping stations. The operators are able to generate preventive maintenance and corrective work orders; as well as document work performed and issue work order history reports.

A highlight of the major maintenance carried out for 2017 is outlined below:

- The raw sewage pumps at both the Hebert and James Pump Stations were inspected and maintained by the operators.
- The Herbert Street, James Street and Sewage plant diesel generators received their annual service in early 2017 and are inspected and ran monthly.
- Annual greasing and oil changes were completed on all blowers, Vibration readings are taken annually.
- All submersible pumps were inspected.
- Number one and two aerobic digesters including headers and piping were cleaned, inspected and serviced by the operators in the spring and fall.
- The air lift piping on all the filter air lifts were pulled and inspected.
- The UV system was monitored daily by the operators in 2017 for proper intensity and the lenses cleaned monthly, the bulbs were replaced as needed.
- Outside contractors inspected the gas detectors, diesel generators, chain falls, beams, flow meters and lab equipment.
- DTM rebuild RAS pump 1.
- DTM replaced in-board bearing on Blower 1.
- Replaced Digester 1 isolation valve.
- London Compressed Air Tech serviced compressors.
- Aeration Cell 2 drained, cleaned and inspected.
- Herbert St SPS pump 3 replaced.
- Outfall to river inspected.
- Flowmetrix installed ultra-sonic level transducer for effluent outfall.
- Prestige installed fans in blower 2 cabinet.
- Prestige repaired one exhaust fan and replaced the other at James St SPS.
- Alum system flushed and inspected.

4. Influent – Effluent Quality Assurance Measures

The influent sample is obtained by a 24hr composite sampler (AquaCell), located at the headwork's of the treatment plant after screen and grit removal. A 100 mL sample is collected every 40 minutes.

A 24hr-composite sampler (Epic), located downstream of the effluent UV channel obtained the effluent sample. A 75 mL sample is collected every 15 minutes. On November 28/2017 a new AquaCell composite sampler was installed. A 100 mL sample is collected every 40 minutes.

The effluent and influent samples were sent to Maxxam Analytics Inc. in Mississauga, Ontario. Maxxam is responsible for performing the quality assurance and control checks. For quality assurance purposes, the operator will split samples with the analytical tests performed in-house and at the contract laboratory. The operator performs a comparison of the sample results.

5. Calibration methods/Maintenance procedures for monitoring equipment

Copies of the calibration reports for the return activated sludge, waste activated sludge, and filter backwash water and influent flow meters are filed at the sewage plant.

D.O. probes and meters are cleaned and calibrated as per the manufactures specifications, by the operators.

The pH meter is calibrated once a month, the meter is used on a daily basis and calibration is checked prior to usage, by the operators.

6. Efforts made and results achieved in meeting Effluent Objectives

The annual effluent CBOD₅ achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The annual effluent suspended solids achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The effluent ammonia results achieved the effluent objectives for the concentration and loading criteria in both the freezing and non-freezing periods.

The effluent total phosphorus results achieved the effluent objectives for the concentration and loading criteria for both the freezing period and non-freezing periods.

7. Monthly Sewage quantities and characteristics from all sources

The plant received sewage from collection system connected sources this reporting period; the town of Mitchell, including residential and small business operations. Parmalat Canada dairy processing plant and Sofina Foods livestock processing plant.

While quantities from all sources are monitored independently, characteristics of the sewage from the Town, Parmalat and Sofina Foods are combined as they are not segregated in the collection system.

In adherence to the operating Environmental Compliance Approval; imported waste flows are monitored and samples are taken for outside analysis on a weekly basis when received.

Total monthly sewage quantities from all sources are tabulated in the following table. Note volumes followed by a * indicate final effluent wash water quantities.

Monthly Quantities from source	Town of Mitchell Million Liters	Parmalat Dairy Million Liters	Sofina Foods Million Liters	Imported waste Million Liters
January	191.457	33.528	0.387	0.838
February	133.075	30.403	0.336	0.404
March	136.009	33.198	0.351	0.744
April	145.823	31.308	0.340	0.365
May	175.654	33.959	0.359	0.152
June	89.010	31.088	0.234	0.104
July	92.186	33.749	11.703	0.121
August	95.691	35.184	20.410	0.221
September	105.585	32.784	20.749	0.128

October	117.871	21.406	23.128	0.000
November	166.387	25.328	28.656	0.150
December	125.659	34.353	25.198	0.067
Totals	1,574.407	376.288	131.851	3.294

The following chart is a comparison of anticipated monthly average daily flow versus, actual average daily flow from all sources.

Average daily flow Vs. anticipated daily flow m³	Town of Mitchell m³	Parmalat Dairy m³	Sofina Foods m³	Imported Waste m³
<i>Anticipated</i>	<i>4755</i>	<i>2000</i>	<i>1400</i>	<i>95</i>
January	6176	1082	12	27
February	4753	1086	12	14
March	4387	1071	11	24
April	4861	1044	11	12
May	5666	1095	12	5
June	2967	1036	8	3
July	2974	1089	378	4
August	3087	1135	658	7
September	3520	1093	692	4
October	3802	691	746	0
November	5546	844	955	5
December	4054	1108	813	2

Monthly average Characteristics of sewage by source; this table shows the combined sewage from the Town of Mitchell, the Parmalat dairy and Sofina Foods.

Characteristics of combined sources	CBOD5 mg/l	TKN mg/l	Total Phosphorus mg/l	Total Suspended solids mg/l
January	330.40	23.6	4.7	147.2
February	140.50	18.1	5.8	127.8
March	137.50	19.8	5.4	115.2
April	187.75	16.8	4.5	120.1
May	80.40	13.8	3.0	88.3
June	257.5	24.5	5.9	206.4
July	159.40	19.0	5.7	128.6
August	490.00	21.8	5.5	200.5
September	267.50	24.3	9.1	215.6
October	462.00	23.2	10.2	313.5
November	260.00	20.5	6.8	161.0
December	391.43	29.3	7.5	257.2

❖ **Monthly average characteristics of the imported waste source.**

Imported waste products accounted for less than 1% of total annual plant flow. Imported waste products are slowly metered into the head works of treatment process where they mix with the influent from the pump stations. In accordance with the operating Environmental Compliance Approval, weekly samples of the imported waste are taken, where applicable; sampling has been primarily of the high strength sources. On those occasions where the carrier has not filled the designated sample containers, operators sampled directly from the receiving station and identified these samples as “Mixed”.

Imported Waste Characteristics	CBOD₅ mg/l	TKN mg/l	Total Phosphorus mg/l	Total suspended solids mg/l
January	9560.25	262.05	134.35	1422.50
February	5275.00	660.25	17.70	893.00
March	2719.67	466.67	183.88	6181.33
April	7543.75	648.25	250.58	833.75
May	490.00	23.67	10.03	386.67
June	1015.00	132.00	25.50	1295.00
July	750.00	87.10	51.00	7200.00
August	37115.00	237.00	236.50	17755.00
September	N/A	N/A	N/A	N/A
October	150.00	19.00	5.80	54.00
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A

Annual average characteristics of imported waste by source

Imported Waste Quality	BOD₅ mg/l	TKN mg/l	Total Phosphorus Mg/l	Total suspended solids mg/l	Volume Received Million Liters
Mitchell Feed Mill	299.60	41.02	17.14	1278.00	1.281
Rothsay	179.50	150.00	5.82	272.00	0.255
Straight Water	6014.29	908.57	187.00	3936.00	0.604
Sheik Halal	1600.00	220.00	32.00	690.00	0.033
Other	2900.00	190.00	13.00	360.00	0.061
Honda	1100.00	4.20	17.00	5500.00	0.027
Natrel	26000.00	380.00	405.00	1215.00	0.068
Wasteco	74000.00	440.00	460.00	35000.00	0.064

8. Sludge generation volume and disposal methods

The annual compliance summary provides a tabulation of sludge generation for 2017. In total, approximately 34562m³ of sludge was wasted.

The plant generated 5533.2m³ of sludge more than in 2016, this is due to the increase of flow and suspended solids loading from Sofina Foods.

Based on current loadings, we expect a similar amount of sludge generation in 2018.

Digested sludge from the WWTP and from the sludge storage lagoon are removed by Ontario Greenways Inc.

Biosolids are applied to sites approved by the OMAFRA/MOECC for land application of biosolids. This year there was land application of biosolids.

The summary of the sludge applied during 2017 and the projections for the year 2018 are as follows:

YEAR	LAND APPLICATION SITE NUMBER	SLUDGE APPLIED TO LAND/ M3
2017	N/A	N/A
2018 Projection	11 Sites Available	

Sufficient capacity is available within the existing approved land application sites for 2018. The acquisition and submission of application site approval requests are currently conducted by the contracted and licensed Hauler / land application contractor.

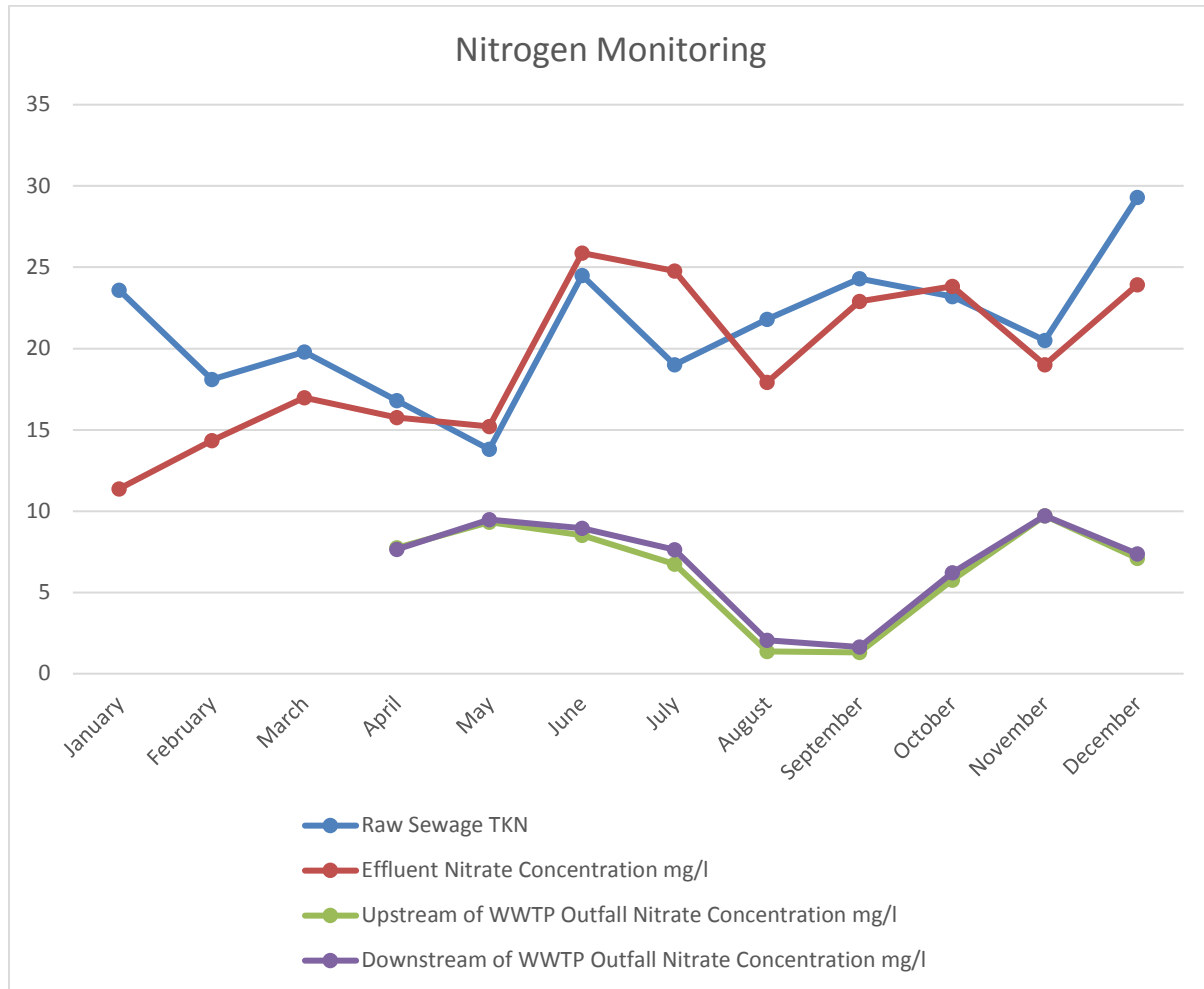
9. Summary of complaints and action taken to address complaints

No complaints were reported to operations staff in 2017.

9. Summary of all by-pass, spill or abnormal discharge events

There were four bypass events in 2017. Two aeration cell bypass events caused by a blower failure and alarm not calling out and two tertiary sand filter bypass due to high flows from heavy rain. Procedures were put in place to prevent these from happening. A back up blower system was installed, where if the blower fails another will start automatically. The filter high level float ball was lowered so it would be tripped sooner in the case of high flows allowing more time to react. Both the backup blower system and alarm system get tested monthly.

Nitrogen Monitoring Summary



Summary

Based on ongoing sampling results, the most significant increase of nitrate in the North Thames River occurs during the summer when stream flow is low and minimal effluent dilution is provided. Correspondingly, background nitrate levels in the North Thames River appear to reduce in the summer which in part offsets the impact of additional nitrate loadings from the wastewater treatment plant during this time period.

The work plan developed by West Perth to date does not include a component for ecological impacts, if any, from higher nitrate values in the North Thames River.

We understand that high nitrate values may be linked to impacts on amphibians during the egg stage of amphibian life cycle (spring). Results to date would indicate a minimal nitrate increase during the spring time, due to higher dilution and to some degree, higher background nitrate levels in the North Thames River during the spring season.

For 2018, the work plan will continue, sampling at the West Perth Line 29 location, and that likely the Line 29 location be used to assess the net increase of nitrate levels in the North Thames River.